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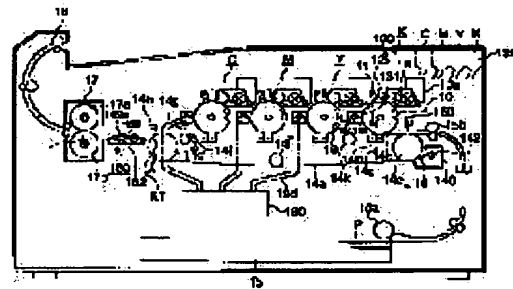
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(54) COLOR IMAGE FORMING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To recycle black color toner that has the highest frequency of use by carrying out recycling of the toner by installing the image forming unit of the black color in the most upstream position in the direction of rotation of an intermediate transfer body and carrying out recycling of the toner and at the same time, installing the image forming units of yellow, magenta, and cyan in downstream positions.

SOLUTION: In this color image forming device, the toner remaining inside a cleaning device 19 of the black color (K) image forming unit 100 installed most upstream in the rotating direction of the intermediate transfer belt 14a is ejected by a screw 19c from the cleaning device 19, carried to a developing device 13 of the black color (K) again through a carrying pipe 19d and recycled. The toner inside the cleaning device 19 provided for each image forming unit 100 for yellow(Y), magenta(M), and cyan(C) are ejected from the cleaning device 19 by the screw 19c, carried to a toner recovering container 190 through carrying pipes 19d and recovered to within the toner recovering container 190.



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JAPANESE

[JP,2000-206755,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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CLAIMS

[Claim(s)]

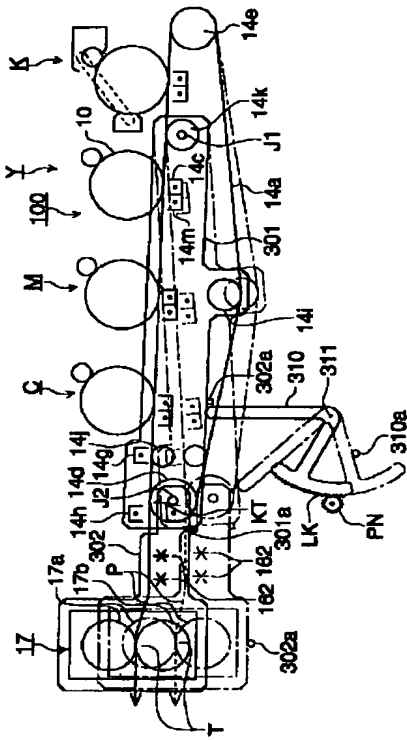
[Claim 1] In the color picture formation equipment which lays the toner image which has yellow, a Magenta, cyanogen, and each black image formation unit, and was formed of each aforementioned image formation unit one by one on top of belt-like a middle imprint object or imprint material Color picture formation equipment characterized by arranging yellow, a Magenta, and the image formation unit of cyanogen in a down-stream position, and collecting toners while arranging a black image formation unit in the hand-of-cut best style position of the aforementioned middle imprint object and recycling a toner.

[Claim 2] It has yellow, a Magenta, cyanogen, and each black image formation unit. In the color picture formation equipment established with a fixing means in the account toner image of back to front which laid the toner image formed of each aforementioned image formation unit one by one on top of belt-like a middle imprint object or imprint material Color picture formation equipment characterized by changing the position of the imprint material guidance means to the aforementioned fixing means, or the aforementioned fixing means into yellow, a Magenta, and the image formation unit of cyanogen with movement of the aforementioned middle imprint object contact or whose alienation was enabled at the time of the image formation by the black toner.

[Claim 3] Color picture formation equipment according to claim 1 or 2 characterized by forming a double-sided picture in the aforementioned imprint material through the aforementioned middle imprint object.

[Translation done.]

Drawing selection [Representative drawing]



[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the color picture formation equipment of the electrophotography method which is made to pile up each other's color toner image formed on two or more image supports, and forms a color picture.

[0002]

[Description of the Prior Art] It sets to a double-sided copy conventionally, and the picture and the timing which imprinted the picture of a field on imprint material, were established, once contained this to double-sided reversal feeding equipment, and were again formed on the image support double, it feeds with imprint material from double-sided reversal feeding equipment, and the method which imprints the picture of the field of another side and is established on imprint material is taken. [it was formed on the image support]

[0003] Since conveyance of imprint material, such as letting feed to double-sided reversal feeding equipment and fixing equipment pass twice like the above, was performed, this double-sided copy equipment had the low reliability of imprint material conveyance, and had become the cause which causes a jam etc. By JP,49-37538,B, JP,54-28740,B, JP,1-44457,A, JP,4-214576,A, etc., on the other hand, after forming a toner image in both sides of imprint material, What is established at once is proposed. to JP,1-44457,A or JP,4-214576,A, especially An image support, The image formation means which consists of an electrification means, an image exposure means, a development means, a cleaning means, etc. is arranged in parallel on two or more set middle imprint object in order of yellow (Y), a Magenta (M), cyanogen (C), and black (K), and the method of forming the double-sided copy of a color picture is proposed.

[0004]

[Problem(s) to be Solved by the Invention] However, the double-sided color picture formation by the above-mentioned proposal Arrange many image formation meanses around a belt-like middle imprint object in order of yellow (Y), a Magenta (M), cyanogen (C), and black (K), and on a belt-like middle imprint object, one color, although image formation is performed in piles, a color toner image at a time The toner on a middle imprint object carries out a re-imprint (adhesion) to an image support at the following image formation process, and the toner of other colors carries out color mixture, and cannot adopt recycling of only a black toner as the black toner which operating frequency tends to recycle highly, either. Moreover, especially, at the time of a jam, the toner of other colors on a middle imprint object adheres to an image support, and the problem of causing color mixture arises.

[0005] This arranges an image formation means in parallel on two or more set middle imprint object in order of yellow (Y), a Magenta (M), cyanogen (C), and black (K). Color picture formation equipment and yellow (Y) which convey imprint material on a middle imprint object, pile up a toner image one by one and form a color toner image on imprint material, After arranging an image formation means in parallel on two or more set middle imprint object in order of a

- Magenta (M), cyanogen (C), and black (K) and piling up a toner image one by one on a middle imprint object, a problem with the same said of the color picture formation equipment which imprints on imprint material collectively and forms a color toner image arises.

[0006] It aims at offering the color picture formation equipment which this invention solves the above-mentioned trouble, enables recycling of a black toner with the highest operating frequency, and enables recycling of a black toner with the highest operating frequency especially at the time of a jam.

[0007]

[Means for Solving the Problem] In the color picture formation equipment which lays the toner image which the above-mentioned purpose has yellow, a Magenta, cyanogen, and each black image formation unit, and was formed of each aforementioned image formation unit one by one on top of belt-like a middle imprint object or imprint material While arranging a black image formation unit in the hand-of-cut best style position of the aforementioned middle imprint object and recycling a toner It is attained by the color picture formation equipment characterized by arranging yellow, a Magenta, and the image formation unit of cyanogen in a down-stream position, and collecting toners (1st invention).

[0008] Moreover, the above-mentioned purpose has yellow, a Magenta, cyanogen, and each black image formation unit. In the color picture formation equipment established with a fixing means in the account toner image of back to front which laid the toner image formed of each aforementioned image formation unit one by one on top of belt-like a middle imprint object or imprint material It follows on movement of the aforementioned middle imprint object contact or whose alienation was enabled at yellow, the Magenta, and the image formation unit of cyanogen at the time of the image formation by the black toner. It is attained by the color picture formation equipment characterized by changing the position of the imprint material guidance means to the aforementioned fixing means, or the aforementioned fixing means (2nd invention).

[0009]

[Embodiments of the Invention] Hereafter, the gestalt of operation of this invention is explained. In addition, the publication of this column limits neither the technical range of a claim, nor a terminological meaning. Moreover, the decision-explanation in the gestalt of the following operations of this invention does not show the best mode, and does not limit a terminological meaning or the terminological technical range of this invention. In addition, in explanation of the following operation gestalten, the field of the imprint material of the side which counters a front face and the field of another side of imprint material, i.e., a middle imprint object, in the field of the imprint material of the side which counters an image support in an imprint region is called rear face, and the picture imprinted by the rear face of a surface picture and imprint material in the picture imprinted by the front face of imprint material is called rear-face picture.

[0010] The image formation process of 1 operation gestalt of the color picture formation equipment in connection with this invention and each mechanism are explained using drawing 1 or drawing 4 . Drawing 1 is the cross-section block diagram showing 1 operation gestalt of the color picture formation equipment in connection with this invention. drawing 2 It is drawing showing the toner image formation state in the color picture formation equipment in connection with this invention. drawing 2 (A) It is drawing showing the toner image formation state when imprinting the rear-face picture formed in the image support on a middle imprint object. drawing 2 (B) It is drawing showing the toner image formation state when forming a surface picture in an image support synchronizing with the rear-face picture on a middle imprint object. drawing 2 (C) It is drawing showing the double-sided image formation to an imprint material top, and drawing 3 is drawing showing movement of alienation and the fixing means of a middle imprint object, and an imprint material guidance means, and drawing 4 is drawing showing other examples of movement of an imprint material guidance means.

[0011] The photo conductor drum whose 10 is an image support for every color in drawing 1 , the scorotron electrification machine whose 11 is an electrification means for every color, The

exposure optical system whose 12 is a picture write-in means for every color, the development counter whose 13 is a development means for every color, The middle imprint belt whose 14a is a middle imprint object, the imprint machine whose 14c is an imprint means for every color, The rear-face imprint machine whose 14g is a rear-face picture imprint means, the electric discharge machine whose 14m is an electric discharge means, The paper electrification machine whose 150 is an imprint material electrification means, the paper separation AC electric discharge machine whose 14h is an imprint material separation means, the conveyance section which has the spur 162 whose 160 is an imprint material guidance means, and 17 are fixing equipment which is fixing meanses.

[0012] In this operation gestalt The cleaning equipment 19 which is the photo conductor drum 10 which is an image support for every color, the scorotron electrification machine 11 which is an electrification means for every color, the exposure optical system 12 which is a picture write-in means for every color, the development counter 13 which is a development means for every color, and a photo conductor drum cleaning means for every color The image formation unit 100 is constituted using these as 1 set. Black (K), As opposed to the hand of cut of middle imprint belt 14a which rotates to the counterclockwise rotation which forms yellow (Y), a Magenta (M), and 4 sets of image formation units 100 for every color of cyanogen (C), and shows them by the arrow of drawing 1 according to the color and sequence to form Black (K) is arranged in order of yellow (Y), a Magenta (M), and cyanogen (C) following the best style. You may arrange the image formation unit 100 of Y, M, and C in order of C, M, and Y.

[0013] The photo conductor drum 10 which is an image support forms photosensitive layers, such as a conductive layer, an a-Si layer, or an organic photosensitive layer (OPC), in the periphery of the metal base of the shape of a cylinder formed for example, of aluminum material, and rotates to the clockwise rotation shown by the arrow of drawing 1 where a conductive layer is grounded.

[0014] By the control grid held at predetermined potential, respectively, the toner by the corona discharge electrode, and the corona discharge of like-pole nature, the scorotron electrification machine 11 which is an electrification means performs the electrization (it sets in this operation gestalt and is minus electrification), and gives uniform potential to the photo conductor drum 10. As a corona discharge electrode of the scorotron electrification machine 11, it is also possible to, use a serrate electrode and a needlelike electrode in addition to this.

[0015] The exposure optical system 12 which is a picture write-in means is arranged around the photo conductor drum 10, as the exposure position on the photo conductor drum 10 is located in the hand-of-cut downstream of the photo conductor drum 10 to the scorotron electrification machine 11 for every color mentioned above. The exposure optical system 12 is a unit for exposure which consists of optical convergence nature optical-transmission objects (tradename : selfoc-lens array) as the exposure element and image formation element of the line which arranged two or more Light Emitting Diodes (light emitting diode) as the drum shaft of the photo conductor drum 10, and a light emitting device of the image exposure light arranged by parallel at main scanning direction in the shape of an array. It is also possible to, use a laser beam study system in addition to this as exposure optical system 12. The exposure optical system 12 for every color carries out image exposure of the photosensitive layer of the photo conductor drum 10 according to the image data of each color which was read by the picture reader of another object and was memorized by memory, and forms an electrostatic latent image on the photo conductor drum 10 for every color.

[0016] The development counter 13 which is a development means maintains a predetermined gap to the peripheral surface of the photo conductor drum 10. The thickness of 0.5–1mm rotated to the hand of cut and the forward direction of the photo conductor drum 10, It had the development sleeve 131 formed by the nonmagnetic stainless steel or the nonmagnetic aluminum material of the shape of a cylinder with an outer diameter of 15–25mm, and one component or two component developer of yellow (Y), a Magenta (M), cyanogen (C), and black

- (K) is held in the interior according to the development color for every color. Un-illustrating dashes a development counter 13, it opens the photo conductor drum 10 and a predetermined gap, for example, 100–500 micrometers, by the koro, is maintained at non-contact, by impressing the development bias which superimposed direct current voltage and alternating voltage to the development sleeve 131, performs non-contact reversal development and forms a toner image on the photo conductor drum 10. Toner feed hopper 13a is prepared in the development counter 13 for every color, and the developer of the color which followed the development color of a development counter 13 from toner feed hopper 13a is supplied. It dissociates with a development counter 13, toner feed hopper 13a for every color is prepared in the equipment upper part (upper right of the color picture formation equipment of drawing 1), without preparing toner feed hopper 13a as a development counter 13 and one, and it may be made to supply a developer.

[0017] A volume resistivity is the endless belt of 109 – 1012 ohm-cm preferably 108 to 1016 ohm-cm, for example, middle imprint belt 14a which is a middle imprint object is the seamless belt of the two-layer composition which performed fluorine coating with a thickness of 5–50 micrometers on the outside of a half-conductivity film base with a thickness of 0.1–1.0mm which distributed the electrical conducting material to engineering plastics, such as a denaturation polyimide, a heat-curing polyimide, an ethylene tetrafluoroethylene copolymer, a polyvinylidene fluoride, and a nylon alloy, as a toner filming If it considers as the base of middle imprint belt 14a, a half-conductivity rubber belt with a thickness of 0.5–2.0mm which distributed the electrical conducting material can also be used for silicone rubber or polyurethane rubber. middle imprint belt 14a -- respectively -- a roller -- drive roller 14d and ground roller 14j which are a member, and a belt -- alienation -- it is laid [firmly] across axis-of-rotation roller 14k, follower roller 14e, and tension roller 14i, and rotates to the counterclockwise rotation shown by the arrow of drawing 1 follower roller 14e, ground roller 14j, and a belt -- alienation -- fixing and rotating axis-of-rotation roller 14k and drive roller 14d, tension roller 14i is supported by elasticity, such as a non-illustrated spring, possible [movement], and rotates It rotates, and drive roller 14d drives middle imprint belt 14a, and makes it rotate in response to a drive [drive motor / non-illustrated]. rotation of middle imprint belt 14a -- ground roller 14j and a belt -- alienation -- axis-of-rotation roller 14k, follower roller 14e, and tension roller 14i follow and rotate The belt slack of middle imprint belt 14a under rotation becomes it tense by tension roller 14i. a belt -- alienation -- axis-of-rotation roller 14k is prepared between the position of the image formation unit 100 of K arranged in the hand-of-cut best style position of middle imprint belt 14a, and image formation unit 100 position of the following Y The recording paper P which is imprint material is supplied to the position where middle imprint belt 14a is laid [firmly] across follower roller 14e, and it is conveyed by middle imprint belt 14a. In the curvature section KT of the edge by the side of the fixing equipment 17 of middle imprint belt 14a laid by drive roller 14d, the recording paper P is separated from middle imprint belt 14a.

[0018] The image formation unit 100 for every color is arranged in the outside (on drawing 1) of middle imprint belt 14a which is the above-mentioned middle imprint object, and middle imprint belt 14a is minded. Counter with drive roller 14d and 14h of paper separation AC electric discharge machines which are an imprint material separation means Counter with ground roller 14j and 14g of rear-face imprint machines which are a rear-face picture imprint means Moreover, counter with follower roller 14e and the middle imprint belt cleaning equipment 140 which is a middle imprint object cleaning means is formed. Moreover, on both sides of middle imprint belt 14a, it counters with the photo conductor drum 10 of the image formation unit 100 for every color, it arranges to imprint machine 14c and this imprint machine 14c which are an imprint means for every color, and 14m of electric discharge machines which are the electric discharge means of a middle imprint object is formed.

[0019] Imprint machine 14c which is an imprint means for every color is a corona discharge machine which counters the photo conductor drum 10 for every color, and is formed on both

- sides of middle imprint belt 14a, and forms imprint region 14b for every color between middle imprint belt 14a and the photo conductor drum 10 for every color. Polar (it sets in this operation gestalt and is plus polarity) direct current voltage opposite to a toner is impressed to imprint machine 14c for every color, and the toner image on the photo conductor drum 10 for every color is imprinted by forming imprint electric field in imprint region 14b on a middle imprint belt 14a top or the front face of imprint material.

[0020] It is preferably constituted by the corona-discharge machine, it is prepared in ground roller 14j prepared between imprint machine 14c and drive roller 14d on both sides of middle imprint belt 14a face to face, polar (it sets in this operation gestalt and is plus polarity) direct current voltage opposite to a toner is impressed, and 14g of rear-face imprint machines which are a rear-face picture imprint means imprints the toner image on middle imprint belt 14a at the rear face of the recording paper P.

[0021] 14m of electric discharge machines which are an electric discharge means for every color is constituted by the corona discharge machine. To the move direction of middle imprint belt 14a if needed to the downstream of imprint machine 14c which is an imprint means for every color It stands in a row with imprint machine 14c for every color, and it is prepared, the alternating voltage which superimposed the direct current voltage of a toner, like-pole nature, or reversed polarity is impressed, and the charge of middle imprint belt 14a in which an electric charge is carried out by voltage impression of imprint machine 14c is discharged.

[0022] It is preferably constituted by the serrate electrode, and it counters with follower roller 14e grounded on both sides of middle imprint belt 14a, and is prepared, and the direct current voltage of a toner and like-pole nature (it sets in this operation gestalt and is minus polarity) is impressed, the paper electrification machine 150 which is an imprint material electrification means is charged, and middle imprint belt 14a is made to adsorb the recording paper P in it. It is also possible to use the paper electrification brush in which the contact and contact release to a corona discharge machine or middle imprint belt 14a other than a serrate electrode are possible, a paper electrification roller, etc. as a paper electrification machine 150.

[0023] 14h of paper separation AC electric discharge machines which are an imprint material separation means is preferably constituted by the corona discharge machine. Counter drive roller 14d grounded by the fixing equipment 17 side-edge section of middle imprint belt 14a on both sides of middle imprint belt 14a if needed, and it is prepared. The alternating voltage which superimposed the direct current voltage of a toner, like-pole nature, or reversed polarity if needed is impressed, the recording paper P conveyed by middle imprint belt 14a is discharged, and it dissociates from middle imprint belt 14a.

[0024] The conveyance section 160 has the spur 162 which is an imprint material guidance means, and is prepared between the curvature section KT of the edge by the side of the fixing equipment 17 of middle imprint belt 14a, and fixing equipment 17. The conveyance section 160 prevents that, and become or a toner fixes on middle imprint belt 14a with the heat from fixing equipment 17 that the toner image supported by middle imprint belt 14a becomes with some weld, and it is hard to imprint. [that middle imprint belt 14a deforms]

[0025] The spur 162 which is an imprint material guidance means has two or more height 162a in a peripheral surface, and is prepared free [rotation] centering on the rotation support shaft 165. A spur 162 guides the rear-face side of the recording paper P, conveys the recording paper P, fixing the penetration direction to the fixing equipment 17 of the recording paper P, is stabilized and conveys the recording paper P to fixing equipment 17 while it prevents disorder of the rear-face toner image of the recording paper P which has a toner image to both sides.

[0026] The fixing equipment 17 which is a fixing means is established in the toner image on the recording paper P which has the nip section T conveyed by consisting of fixing members of the two shape of a roller of fixing roller 17a and sticking-by-pressure roller 17b which have a heater inside, carrying out pinching conveyance of the recording paper P in the nip section T between fixing roller 17a and sticking-by-pressure roller 17b, and adding heat and a pressure.

[0027] Next, an image formation process is explained.

[0028] By starting of the photo conductor drive motor which is not illustrated by the start of image recording, the photo conductor drum 10 of the image formation unit 100 of the black (K) arranged in the hand-of-cut best style position of middle imprint belt 14a rotates to the clockwise rotation shown by the arrow of drawing 1 , and grant of potential is simultaneously started by the photo conductor drum 10 of K by the electrization of the scorotron electrification machine 11 of K.

[0029] After potential is given to the photo conductor drum 10 of K, the picture writing by the 1st chrominance signal, i.e., the electrical signal corresponding to the image data of K, is started by the exposure optical system 12 of K, and it has an electrostatic latent image corresponding to the picture of K of a manuscript picture formed in the front face of the photo conductor drum 10 of K.

[0030] Reversal development of the aforementioned latent image is carried out in the non-contact state by the development counter 13 of K, and a black (K) toner image is formed according to rotation of the photo conductor drum 10 of K.

[0031] The toner image of K used as the rear-face picture formed of the above-mentioned image formation process on the photo conductor drum 10 of K which is an image support is imprinted by imprint machine 14c of K which is an imprint means in imprint region 14b of K on middle imprint belt 14a which is a middle imprint object. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of K is discharged with 14vessels of electric discharge machines of K.

[0032] Subsequently, the toner image of K and a synchronization are taken and, as for middle imprint belt 14a, potential is given by the image formation unit 100 of yellow (Y) by the electrization of the scorotron electrification machine 11 of Y. The picture writing by the 2nd chrominance signal, i.e., the electrical signal corresponding to the image data of Y, is performed by the exposure optical system 12 of Y. Of imprint machine 14c of Y whose toner image of Y used as the rear-face picture formed on the photo conductor drum 10 of Y of the non-contact reversal development by the development counter 13 of Y is an imprint means in imprint region 14b of Y, the toner image of the upper shell Y of the toner image of the aforementioned K piles up, and is formed. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of Y is discharged with 14vessels of electric discharge machines of Y.

[0033] According to the same process, the superposition toner image of K and Y and a synchronization are taken. The toner image of M used as the rear-face picture corresponding to the image data of M by the 3rd chrominance signal formed on the photo conductor drum 10 of M of the image formation unit 100 of a Magenta (M) sets to imprint region 14b of M. Of imprint machine 14c of M which is an imprint means, the toner image of the upper shell M of the aforementioned K and the toner image of Y piles up, and is formed. Furthermore the superposition toner image of K, Y, and M and the synchronization were taken, and were formed on the photo conductor drum 10 of C of the image formation unit 100 of cyanogen (C). The toner image of C used as the rear-face picture used as the rear-face picture corresponding to the image data of C by the 4th chrominance signal sets to imprint region 14b of C. Of imprint machine 14c of C which is an imprint means, the toner image of the upper shell C of the aforementioned toner image of K, Y, and M piles up, and is formed, and the superposition color toner image of K, Y, M, and C of a rear-face picture is formed on middle imprint belt 14a. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of M and C is discharged with 14vessels of electric discharge machines of M and C. (Drawing 2 (A)) .

[0034] Although the toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint is cleaned by cleaning-blade 19a which consists of the rubber material which resulted in the cleaning equipment 19 as a photo conductor drum cleaning

means, and contacted the photo conductor drum 10. The toner which collected in the cleaning equipment 19 of the image formation unit 100 of the black (K) arranged in the hand-of-cut best style position of middle imprint belt 14a is discharged by screw 19c from cleaning equipment 19. For example, through conveyance pipe 19d which connotes the rotating spiral spring and conveys a toner, it is conveyed again to the development counter 13 of K, and is recycled (reuse). It is arranged at the downstream of the black (K) image formation unit 100, the toner image supported on middle imprint belt 14a may carry out a re-imprint (adhesion) to the photo conductor drum 10 at the following image formation process, and reuse can be impossible easily. The toner in the cleaning equipment 19 formed in yellow (Y), a Magenta (M), and each image formation unit 100 of cyanogen (C) is discharged by screw 19c from cleaning equipment 19. For example, it is conveyed to the container 190 for toner recycling through conveyance pipe 19d which connotes the rotating spiral spring and conveys a toner, and is collected in the container 190 for toner recycling. It becomes recyclable [a black toner], without the toner of other colors carrying out color mixture to the black toner which operating frequency tends to recycle highly by this.

[0035] After the superposition color toner image which turns into a rear-face picture on middle imprint belt 14a as mentioned above is formed, the synchronization with the color toner image of the rear-face picture currently succeedingly supported by middle imprint belt 14a is taken, and the toner image of K which turns into a surface picture of K by the image formation unit 100 of K is formed on the photo conductor drum 10 of K like the above-mentioned color picture formation process. Under the present circumstances, image data is changed so that the surface picture of K formed on the photo conductor drum 10 of K may turn into a mirror image to the rear-face picture formed on the photo conductor drum 10 of Above K.

[0036] In connection with the surface image formation of K to the photo conductor drum 10 top of K, from the feed cassette 15 whose recording paper P which is imprint material is an imprint material receipt means. It is sent out by send roller 15a and conveyed to timing roller 15b as an imprint material feed means. by the drive of timing roller 15b. The synchronization with the toner image of the surface picture of K supported on the photo conductor drum 10 of K and the color toner image of the rear-face picture currently supported by middle imprint belt 14a is taken, and imprint region 14b of K is fed. Under the present circumstances, paper electrification is carried out at a toner and like-pole nature, middle imprint belt 14a is adsorbed by the paper electrification machine 150 serrate in the nose of cam where it considered as the contact state and the direct current voltage of a toner and like-pole nature (it sets in this operation gestalt and is minus polarity) was impressed to the recording paper P, and imprint region 14b of K is fed with the recording paper P with it (drawing 2 (B)). By performing paper electrification to a toner and like-pole nature, it prevented paying well with the toner image on middle imprint belt 14a, or the toner image on the photo conductor drum 10 of K, and disorder of a toner image is prevented.

[0037] In imprint region 14b of K, the surface picture on the photo conductor drum 10 of K is imprinted by imprint machine 14c of K as an imprint means by which polar (it sets in this operation gestalt and is plus polarity) voltage opposite to a toner was impressed, on the front face of the recording paper P. At this time, the rear-face picture on middle imprint belt 14a exists on middle imprint belt 14a without the recording paper's P imprinting. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of K is discharged with 14vessels of electric discharge machines of K.

[0038] Similarly the synchronization with the color toner image of a rear-face picture and the toner image of the surface picture of K which are supported by middle imprint belt 14a is taken. The toner image of the surface picture of Y, M, and C is formed on the photo conductor drum 10 of the image formation unit 100 of Y, M, and C. The toner image of the surface picture of Y, M, and C by each imprint machine 14c as an imprint means by which polar (it sets in this operation gestalt and is plus polarity) voltage opposite to a toner was impressed by imprint

region 14b of Y, M, and C Y on each photo conductor drum 10, The color toner image of the surface picture of M and C is imprinted one by one by the front face of the recording paper P in order of Y, M, and C. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of Y, M, and C is discharged with 14vessels of electric discharge machines of Y, M, and C. At this time, the rear-face picture on middle imprint belt 14a exists on middle imprint belt 14a without the recording paper's P imprinting. Under the present circumstances, with having mentioned above, similarly, image data is changed so that the surface picture of Y, M, and C which are formed on the photo conductor drum 10 of Y, M, and C may become with a mirror image to the rear-face picture formed on the photo conductor drum 10 of Above Y, M, and C, respectively.

[0039] The recording paper P with which the color toner image was imprinted by the front face is conveyed at 14g of rear-face imprint machines as a rear-face picture imprint means by which polar (it sets in this operation gestalt and is plus polarity) voltage opposite to a toner was impressed, and the color toner image of the rear-face picture on the peripheral surface of middle imprint belt 14a bundles it up with 14vessels of rear-face imprint machines, and it is imprinted by the rear face of the recording paper P (drawing 2 (C)).

[0040] The recording paper P with which the color toner image was formed in both sides By the curvature of the curvature section KT of middle imprint belt 14a, and the electric discharge operation with 14h of paper separation AC electric discharge machines as an imprint material separation means prepared in the edge of middle imprint belt 14a if needed Dissociate from middle imprint belt 14a, and it is conveyed through the spur 162 prepared in the conveyance section 160 to the fixing equipment 17 as a fixing means. It is fixed to the toner image on the recording paper P by conveying between the nip sections T between fixing roller 17a and sticking-by-pressure roller 17b, and being able to add heat and a pressure in the nip section T. The recording paper P with which double-sided image recording was made has the front reverse side reversed, is sent, and is discharged with the delivery roller 18 to the tray of the equipment exterior.

[0041] The toner which remained on the peripheral surface of middle imprint belt 14a after an imprint is countered and formed in follower roller 14e on both sides of middle imprint belt 14a, and is cleaned by the middle imprint object cleaning equipment 140 which is a middle imprint object cleaning means have the middle imprint object cleaning blade 141 in which contact and contact release are possible in middle imprint belt 14a by using a pivot 142 as the rotation supporting point.

[0042] Moreover, cleaning equipment 19 removes a remains toner, the history of the photo conductor drum 10 in previous image formation is canceled by the uniform photographic filter before non-illustrated electrification, and the toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint is in the following image formation cycle. As mentioned above, the toner which collected in the cleaning equipment 19 of the image formation unit 100 of the black (K) arranged in the hand-of-cut best style position of middle imprint belt 14a is conveyed again to the development counter 13 of K, and is recycled (reuse). It is arranged at the downstream of the black (K) image formation unit 100, the toner image supported on middle imprint belt 14a may carry out a re-imprint (adhesion) to the photo conductor drum 10 at the following image formation process, and reuse can be impossible easily. The toner in the cleaning equipment 19 formed in yellow (Y), a Magenta (M), and each image formation unit 100 of cyanogen (C) is conveyed to the container 190 for toner recycling, and are collected in the container 190 for toner recycling.

[0043] It becomes recyclable [the black toner which is not conspicuous even if it is prevented by the above that the black toner on a middle imprint object adheres to the image support of other colors, operating frequency is high and it carries out color mixture most by it]. It becomes recyclable [the black toner which is not conspicuous even if it is prevented that the black toner on a middle imprint object adheres to the image support of other colors especially

at the time of a jam, operating frequency is high and it carries out color mixture most].

[0044] Of course, also do single-sided image formation which forms a picture at one side of only the front face of imprint material, or a rear face out of the double-sided image formation which forms a picture in both sides of imprint material which was explained with the above-mentioned operation gestalt with above color picture formation equipment.

[0045] It can rotate focusing on the medial axis J1 of axis-of-rotation roller 14k. moreover, the belt with which middle imprint belt 14a is inscribed in the support plate 301 of both sides according to drawing 3 -- alienation -- It is arranged in the hand-of-cut best style position of middle imprint belt 14a. The downstream of the black (K) image formation unit 100 in which toner recycling is possible, The photo conductor drum 10 of the image formation unit 100 of Y, M, and C, and Y which counters, Drive roller 14d which lays 14m of electric discharge machines and 14g of rear-face imprint machines of imprint machine 14c of M and C, and Y, M and C, 14h of paper separation AC electric discharge machines, and middle imprint belt 14a, the belt of ground roller 14j, tension roller 14i, and the support-plate 301 center of rotation -- alienation -- axis-of-rotation roller 14k etc. is attached in a support plate 301 Moreover, the support plate 302 of both sides can be rotated focusing on the drive roller 14d medial axis J2, and the spur 162 and the fixing equipment 17 which are an imprint material guidance means are attached in a support plate 302.

[0046] the time of the monochrome image formation by the black (K) toner -- a belt -- alienation -- a support plate 301 is rotated focusing on the medial axis J1 of axis-of-rotation roller 14k, the support plate 301 which has middle imprint belt 14a is moved, and middle imprint belt 14a is made to estrange from yellow (Y), a Magenta (M), and the image formation unit 100 of cyanogen (C)

[0047] The rack LK in which the lever 310 which holds a support plate 301 in the state where it was dashed against stopper 302a which engaged with the bottom edge of a support plate 301 in the end, and was prepared in it at the support plate 301 was formed by the other end By rotation of Pinion PN which connects on this rack LK, for example, rotates through non-illustrated a control section and a drive motor at the time of selection of monochrome image formation from a non-illustrated control unit A lever 310 rotates centering on the fixed shaft 311 in an alternate long and short dash line **** position from the position shown in drawing 3 as a solid line. It rotates. the alternate long and short dash line **** position from a position which a support plate 301 shows to drawing 3 as a solid line in connection with this -- a belt -- alienation -- until it contacts stopper 310a by using the medial axis J1 of axis-of-rotation roller 14k as the supporting point In the state [that middle imprint belt 14a is in contact with the image formation unit 100 of K], it is estranged from the image formation unit 100 of Y, M, and C. Under the present circumstances, in order to guarantee penetration of the recording paper P to fixing equipment 17, while the support plate 302 currently stopped and held by stopper 301a prepared in the support plate 301 rotates the drive roller 14d medial axis J2 as a center with movement which is drive roller 14d, it is caudad moved to the position stopped in stopper 302a. A spur 162 and fixing equipment 17 are caudad moved with movement of a support plate 302 (repositioning). The recording paper P is guided by the spur 162 caudad moved as a dotted line showed to drawing 3 , and it is fixed to the toner image on the recording paper P by being conveyed to the fixing equipment 17 moved caudad, conveying between the nip sections T between fixing roller 17a and sticking-by-pressure roller 17b, and being able to add heat and a pressure in the nip section T.

[0048] Moreover, as shown in drawing 4 , the spur 162 which is an imprint material guidance means is attached. The support plate 303 which can rotate is formed focusing on the drive roller 14d medial axis J2. In order to guarantee penetration of the recording paper P to fixing equipment 17 with movement (movement in the alternate long and short dash line **** position shown in drawing 4 as a solid line from a position) in the lower part of the support plate 301 which has middle imprint belt 14a, The support plate 303 of the both sides currently stopped

and held by stopper 301a prepared in the support plate 301 with movement of drive roller 14d It is possible to also make it incline and move to the position stopped in stopper 303a, making an alternate long and short dash line **** position rotate the drive roller 14d medial axis J2 as a center from the position shown in drawing 4 as a solid line. With movement of a support plate 303, a spur 162 inclines and it is moved caudad (repositioning). It is fixed to the toner image on the recording paper P by the recording paper's P being guided by the spur 162 arranged by inclining as a dotted line shows to drawing 4 , conveying it to fixing equipment 17, conveying between the nip sections T between fixing roller 17a and sticking-by-pressure roller 17b, and being able to add heat and a pressure in the nip section T.

[0049] It becomes recyclable [the black toner which is not conspicuous even if it is prevented by the above that the black toner on a middle imprint object adheres to the image support of other colors, operating frequency is high and it carries out color mixture most by it]. It becomes recyclable [the black toner which is not conspicuous even if it is prevented that the black toner on a middle imprint object adheres to the image support of other colors especially at the time of a jam, operating frequency is high and it carries out color mixture most].

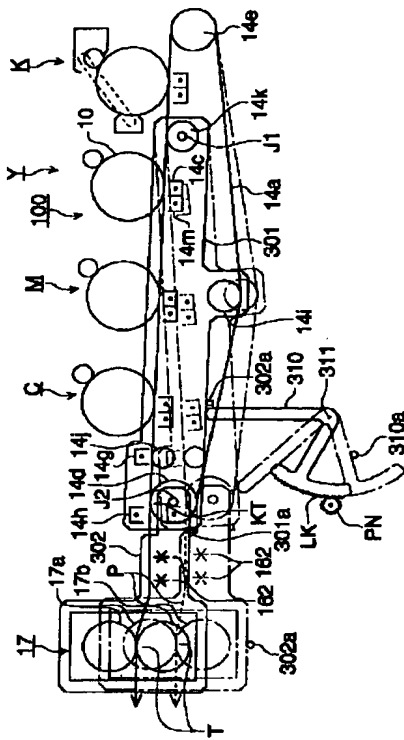
[0050] The composition explained by above-mentioned drawing 2 or drawing 4 Yellow (Y), a Magenta (M), An image formation means is arranged in parallel on two or more set middle imprint object in order of cyanogen (C) and black (K). Color picture formation equipment and yellow (Y) which convey imprint material on a middle imprint object, pile up a toner image one by one and form a color toner image on imprint material, An image formation means is arranged in parallel on two or more set middle imprint object in order of a Magenta (M), cyanogen (C), and black (K). It is possible to suppose that it is the same also about the color picture formation equipment which imprints on imprint material collectively and forms a color toner image, after piling up a toner image one by one on a middle imprint object. it becomes recyclable [the black toner which is not conspicuous even if it is prevented that the black toner on the same effect, i.e., the Nakama imprint object, adheres to the image support of other colors, operating frequency is high and it carries out color mixture to this having mentioned above most] It becomes recyclable [the black toner which is not conspicuous even if it is prevented that the black toner on a middle imprint object adheres to the image support of other colors especially at the time of a jam, operating frequency is high and it carries out color mixture most].

[0051]

[Effect of the Invention] According to this invention, it becomes recyclable [the black toner which is not conspicuous even if it is prevented that the black toner on a middle imprint object adheres to the image support of other colors, operating frequency is high and it carries out color mixture most]. It becomes recyclable [the black toner which is not conspicuous even if it is prevented that the black toner on a middle imprint object adheres to the image support of other colors especially at the time of a jam, operating frequency is high and it carries out color mixture most].

[Translation done.]

Drawing selection [Representative drawing] 



[Translation done.]

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JAPANESE

[JP,2000-206755,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

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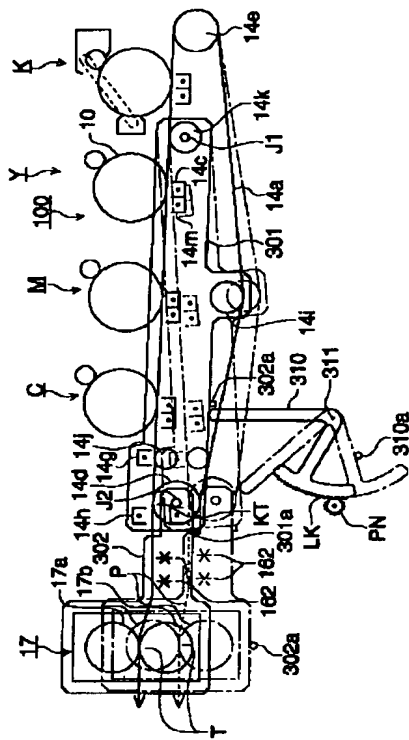
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[The technical field to which invention belongs] this invention relates to the color picture formation equipment of the electrophotography method which is made to pile up each other's color toner image formed on two or more image supports, and forms a color picture.

[Translation done.]

Drawing selection [Representativ drawing] 



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[JP,2000-206755,A]

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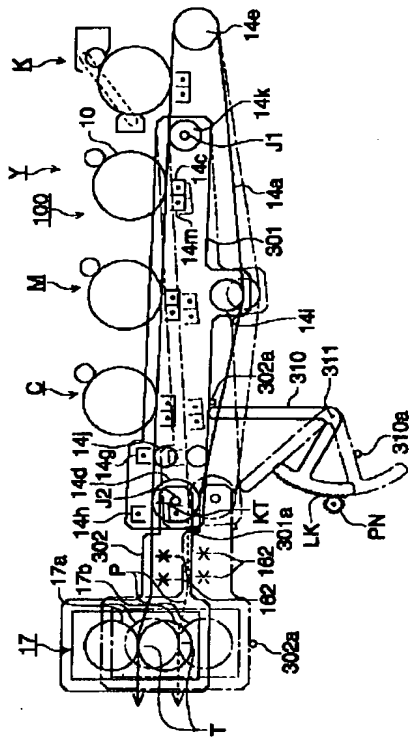
PRIOR ART

[Description of the Prior Art] It sets to a double-sided copy conventionally, and the picture and the timing which imprinted the picture of a field on imprint material, were established, once contained this to double-sided reversal feeding equipment, and were again formed on the image support are doubled, it feeds with imprint material from double-sided reversal feeding equipment, and the method which imprints the picture of the field of another side and is established on imprint material is taken. [it was formed on the image support]

[0003] Since conveyance of imprint material, such as letting feed to double-sided reversal feeding equipment and fixing equipment pass twice like the above, was performed, this double-sided copy equipment had the low reliability of imprint material conveyance, and had become the cause which causes a jam etc. On the other hand, it is yellow (Y) about the image formation means which what is established at once after forming a toner image in both sides of imprint material by JP,49-37538,B, JP,54-28740,B, JP,1-44457,A, JP,4-214576,A, etc. is proposed, and becomes JP,1-44457,A and JP,4-214576,A from an image support, an electrification means, an image exposure means, a development means, a cleaning means, etc. especially. It arranges in parallel on two or more set middle imprint object in order of a Magenta (M), cyanogen (C), and black (K), and the method of forming the double-sided copy of a color picture is proposed.

[Translation done.]

Drawing selection [Repr sentativ drawing] 



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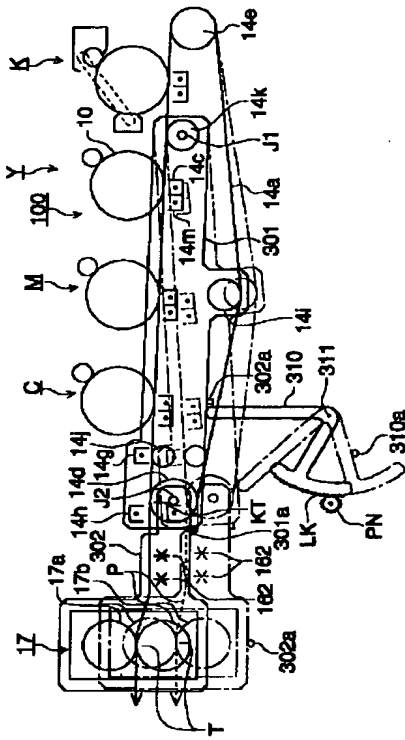
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EFFECT OF THE INVENTION

[Effect of the Invention] According to this invention, it becomes recyclable [the black toner which is not conspicuous even if it is prevented that the black toner on a middle imprint object adheres to the image support of other colors, operating frequency is high and it carries out color mixture most]. It becomes recyclable [the black toner which is not conspicuous even if it is prevented that the black toner on a middle imprint object adheres to the image support of other colors especially at the time of a jam, operating frequency is high and it carries out color mixture most].

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TECHNICAL PROBLEM

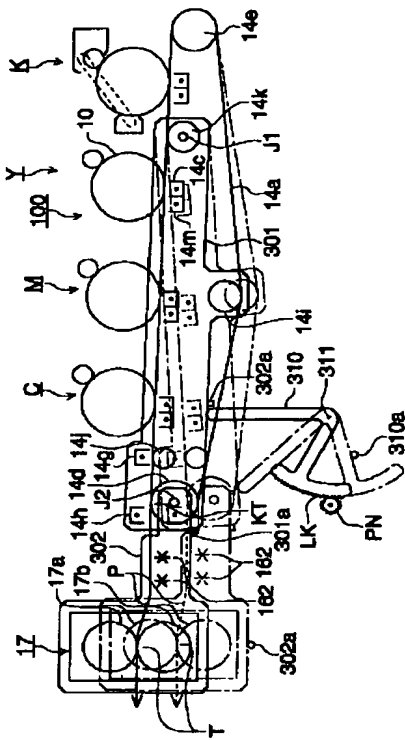
[Problem(s) to be Solved by the Invention] However, the double-sided color picture formation by the above-mentioned proposal Arrange many image formation meanses around a belt-like middle imprint object in order of yellow (Y), a Magenta (M), cyanogen (C), and black (K), and on a belt-like middle imprint object, one color, although image formation is performed in piles, a color toner image at a time The toner on a middle imprint object carries out a re-imprint (adhesion) to an image support at the following image formation process, and the toner of other colors carries out color mixture, and cannot adopt recycling of only a black toner as the black toner which operating frequency tends to recycle highly, either. Moreover, especially, at the time of a jam, the toner of other colors on a middle imprint object adheres to an image support, and the problem of causing color mixture arises.

[0005] This arranges an image formation means in parallel on two or more set middle imprint object in order of yellow (Y), a Magenta (M), cyanogen (C), and black (K). Color picture formation equipment and yellow (Y) which convey imprint material on a middle imprint object, pile up a toner image one by one and form a color toner image on imprint material, After arranging an image formation means in parallel on two or more set middle imprint object in order of a Magenta (M), cyanogen (C), and black (K) and piling up a toner image one by one on a middle imprint object, a problem with the same said of the color picture formation equipment which imprints on imprint material collectively and forms a color toner image arises.

[0006] It aims at offering the color picture formation equipment which this invention solves the above-mentioned trouble, enables recycling of a black toner with the highest operating frequency, and enables recycling of a black toner with the highest operating frequency especially at the time of a jam.

[Translation done.]

Drawing selection [Representative drawing]



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MEANS

[Means for Solving the Problem] In the color picture formation equipment which lays the toner image which the above-mentioned purpose has yellow, a Magenta, cyanogen, and each black image formation unit, and was formed of each aforementioned image formation unit one by one on top of belt-like a middle imprint object or imprint material While arranging a black image formation unit in the hand-of-cut best style position of the aforementioned middle imprint object and recycling a toner It is attained by the color picture formation equipment characterized by arranging yellow, a Magenta, and the image formation unit of cyanogen in a down-stream position, and collecting toners (1st invention).

[0008] Moreover, the above-mentioned purpose has yellow, a Magenta, cyanogen, and each black image formation unit. In the color picture formation equipment established with a fixing means in the account toner image of back to front which laid the toner image formed of each aforementioned image formation unit one by one on top of belt-like a middle imprint object or imprint material It follows on movement of the aforementioned middle imprint object contact or whose alienation was enabled at yellow, the Magenta, and the image formation unit of cyanogen at the time of the image formation by the black toner. It is attained by the color picture formation equipment characterized by changing the position of the imprint material guidance means to the aforementioned fixing means, or the aforementioned fixing means (2nd invention).

[0009]

[Embodiments of the Invention] Hereafter, the gestalt of operation of this invention is explained. In addition, the publication of this column limits neither the technical range of a claim, nor a terminological meaning. Moreover, the decision-explanation in the gestalt of the following operations of this invention does not show the best mode, and does not limit a terminological meaning or the terminological technical range of this invention. In addition, in explanation of the following operation gestalten, the field of the imprint material of the side which counters a front face and the field of another side of imprint material, i.e., a middle imprint object, in the field of the imprint material of the side which counters an image support in an imprint region is called rear face, and the picture imprinted by the rear face of a surface picture and imprint material in the picture imprinted by the front face of imprint material is called rear-face picture.

[0010] The image formation process of 1 operation gestalt of the color picture formation equipment in connection with this invention and each mechanism are explained using drawing 1 or drawing 4 . Drawing 1 is the cross-section block diagram showing 1 operation gestalt of the color picture formation equipment in connection with this invention. drawing 2 It is drawing showing the toner image formation state in the color picture formation equipment in connection with this invention. drawing 2 (A) It is drawing showing the toner image formation state when imprinting the rear-face picture formed in the image support on a middle imprint object. drawing 2 (B) It is drawing showing the toner image formation state when forming a surface picture in an image support synchronizing with the rear-face picture on a middle imprint object. drawing 2 (C) It is drawing showing the double-sided image formation to an imprint material top, and drawing 3

is drawing showing movement of alienation and the fixing means of a middle imprint object, and an imprint material guidance means, and drawing 4 is drawing showing other examples of movement of an imprint material guidance means.

[0011] The photo conductor drum whose 10 is an image support for every color in drawing 1, the scorotron electrification machine whose 11 is an electrification means for every color, The exposure optical system whose 12 is a picture write-in means for every color, the development counter whose 13 is a development means for every color, The middle imprint belt whose 14a is a middle imprint object, the imprint machine whose 14c is an imprint means for every color, The rear-face imprint machine whose 14g is a rear-face picture imprint means, the electric discharge machine whose 14m is an electric discharge means, The paper electrification machine whose 150 is an imprint material electrification means, the paper separation AC electric discharge machine whose 14h is an imprint material separation means, the conveyance section which has the spur 162 whose 160 is an imprint material guidance means, and 17 are fixing equipment which is fixing meanses.

[0012] In this operation form The cleaning equipment 19 which is the photo conductor drum 10 which is an image support for every color, the scorotron electrification machine 11 which is an electrification means for every color, the exposure optical system 12 which is a picture write-in means for every color, the development counter 13 which is a development means for every color, and a photo conductor drum cleaning means for every color The image formation unit 100 is constituted using these as 1 set. Black (K), As opposed to the hand of cut of middle imprint belt 14a which rotates to the counterclockwise rotation which forms yellow (Y), a Magenta (M), and 4 sets of image formation units 100 for every color of cyanogen (C), and shows them by the arrow of drawing 1 according to the color and sequence to form Black (K) is arranged in order of yellow (Y), a Magenta (M), and cyanogen (C) following the best style. You may arrange the image formation unit 100 of Y, M, and C in order of C, M, and Y.

[0013] The photo conductor drum 10 which is an image support forms photosensitive layers, such as a conductive layer, an a-Si layer, or an organic photosensitive layer (OPC), in the periphery of the metal base of the shape of a cylinder formed for example, of aluminum material, and rotates to the clockwise rotation shown by the arrow of drawing 1 where a conductive layer is grounded.

[0014] By the control grid held at predetermined potential, respectively, the toner by the corona discharge electrode, and the corona discharge of like-pole nature, the scorotron electrification machine 11 which is an electrification means performs an electrification operation (it sets in this operation form and is minus electrification), and gives uniform potential to the photo conductor drum 10. As a corona discharge electrode of the scorotron electrification machine 11, it is also possible to, use a serrate electrode and a needlelike electrode in addition to this.

[0015] The exposure optical system 12 which is a picture write-in means is arranged around the photo conductor drum 10, as the exposure position on the photo conductor drum 10 is located in the hand-of-cut downstream of the photo conductor drum 10 to the scorotron electrification machine 11 for every color mentioned above. The exposure optical system 12 is a unit for exposure which consists of optical convergence nature optical-transmission objects (tradename : selfoc-lens array) as the exposure element and image formation element of the line which arranged two or more Light Emitting Diodes (light emitting diode) as the drum shaft of the photo conductor drum 10, and a light emitting device of the image exposure light arranged by parallel at main scanning direction in the shape of an array. It is also possible to, use a laser beam study system in addition to this as exposure optical system 12. The exposure optical system 12 for every color carries out image exposure of the photosensitive layer of the photo conductor drum 10 according to the image data of each color which was read by the picture reader of another object and was memorized by memory, and forms an electrostatic latent image on the photo conductor drum 10 for every color.

[0016] The development counter 13 which is a development means maintains a predetermined

gap to the peripheral surface of the photo conductor drum 10. The thickness of 0.5–1mm rotated to the hand of cut and the forward direction of the photo conductor drum 10, It had the development sleeve 131 formed by the nonmagnetic stainless steel or the nonmagnetic aluminum material of the shape of a cylinder with an outer diameter of 15–25mm, and one component or two component developer of yellow (Y), a Magenta (M), cyanogen (C), and black (K) is held in the interior according to the development color for every color. Un-illustrating dashes a development counter 13, it opens the photo conductor drum 10 and a predetermined gap, for example, 100–500 micrometers, by KORO, is maintained at non-contact, by impressing the development bias which superimposed direct current voltage and alternating voltage to the development sleeve 131, performs non-contact reversal development and forms a toner image on the photo conductor drum 10. Toner feed hopper 13a is prepared in the development counter 13 for every color, and the developer of the color which followed the development color of a development counter 13 from toner feed hopper 13a is supplied. It dissociates with a development counter 13, toner feed hopper 13a for every color is prepared in the equipment upper part (upper right of the color picture formation equipment of drawing 1), without preparing toner feed hopper 13a as a development counter 13 and one, and it may be made to supply a developer.

[0017] A volume resistivity is the endless belt of 109 – 1012 ohm-cm preferably 108 to 1016 ohm-cm, for example, middle imprint belt 14a which is a middle imprint object is the seamless belt of the two-layer composition which performed fluorine coating with a thickness of 5–50 micrometers on the outside of a half-conductivity film base with a thickness of 0.1–1.0mm which distributed the electrical conducting material to engineering plastics, such as a denaturation polyimide, a heat-curing polyimide, an ethylene tetrafluoroethylene copolymer, a polyvinylidene fluoride, and a nylon alloy, as a toner filming If it considers as the base of middle imprint belt 14a, a half-conductivity rubber belt with a thickness of 0.5–2.0mm which distributed the electrical conducting material can also be used for silicone rubber or polyurethane rubber. middle imprint belt 14a -- respectively -- a roller -- drive roller 14d and ground roller 14j which are a member, and a belt -- alienation -- it is laid [firmly] across axis-of-rotation roller 14k, follower roller 14e, and tension roller 14i, and rotates to the counterclockwise rotation shown by the arrow of drawing 1 follower roller 14e, ground roller 14j, and a belt -- alienation -- fixing and rotating axis-of-rotation roller 14k and drive roller 14d, tension roller 14i is supported by elasticity, such as a non-illustrated spring, possible [movement], and rotates It rotates, and drive roller 14d drives middle imprint belt 14a, and makes it rotate in response to a drive [drive motor / non-illustrated]. rotation of middle imprint belt 14a -- ground roller 14j and a belt -- alienation -- axis-of-rotation roller 14k, follower roller 14e, and tension roller 14i follow and rotate The belt slack of middle imprint belt 14a under rotation becomes it tense by tension roller 14i. a belt -- alienation -- axis-of-rotation roller 14k is prepared between the position of the image formation unit 100 of K arranged in the hand-of-cut best style position of middle imprint belt 14a, and image formation unit 100 position of the following Y The recording paper P which is imprint material is supplied to the position where middle imprint belt 14a is laid [firmly] across follower roller 14e, and it is conveyed by middle imprint belt 14a. In the curvature section KT of the edge by the side of the fixing equipment 17 of middle imprint belt 14a laid by drive roller 14d, the recording paper P is separated from middle imprint belt 14a.

[0018] The image formation unit 100 for every color is arranged in the outside (on drawing 1) of middle imprint belt 14a which is the above-mentioned middle imprint object, and middle imprint belt 14a is minded. Counter with drive roller 14d and 14h of paper separation AC electric discharge machines which are an imprint material separation means Counter with ground roller 14j and 14g of rear-face imprint machines which are a rear-face picture imprint means Moreover, counter with follower roller 14e and the middle imprint belt cleaning equipment 140 which is a middle imprint object cleaning means is formed. Moreover, on both sides of middle imprint belt 14a, it counters with the photo conductor drum 10 of the image formation unit 100

for every color, it arranges to imprint machine 14c and this imprint machine 14c which are an imprint means for every color, and 14m of electric discharge machines which are the electric discharge means of a middle imprint object is formed.

[0019] Imprint machine 14c which is an imprint means for every color is a corona discharge machine which counters the photo conductor drum 10 for every color, and is formed on both sides of middle imprint belt 14a, and forms imprint region 14b for every color between middle imprint belt 14a and the photo conductor drum 10 for every color. Polar (it sets in this operation gestalt and is plus polarity) direct current voltage opposite to a toner is impressed to imprint machine 14c for every color, and the toner image on the photo conductor drum 10 for every color is imprinted by forming imprint electric field in imprint region 14b on a middle imprint belt 14a top or the front face of imprint material.

[0020] It is preferably constituted by the corona-discharge machine, it is prepared in ground roller 14j prepared between imprint machine 14c and drive roller 14d on both sides of middle imprint belt 14a face to face, polar (it sets in this operation gestalt and is plus polarity) direct current voltage opposite to a toner is impressed, and 14g of rear-face imprint machines which are a rear-face picture imprint means imprints the toner image on middle imprint belt 14a at the rear face of the recording paper P.

[0021] 14m of electric discharge machines which are an electric discharge means for every color is constituted by the corona discharge machine. To the move direction of middle imprint belt 14a if needed to the downstream of imprint machine 14c which is an imprint means for every color It stands in a row with imprint machine 14c for every color, and it is prepared, the alternating voltage which superimposed the direct current voltage of a toner, like-pole nature, or reversed polarity is impressed, and the charge of middle imprint belt 14a in which an electric charge is carried out by voltage impression of imprint machine 14c is discharged.

[0022] It is preferably constituted by the serrate electrode, and it counters with follower roller 14e grounded on both sides of middle imprint belt 14a, and is prepared, and the direct current voltage of a toner and like-pole nature (it sets in this operation gestalt and is minus polarity) is impressed, the paper electrification machine 150 which is an imprint material electrification means is charged, and middle imprint belt 14a is made to adsorb the recording paper P in it. It is also possible to use the paper electrification brush in which the contact and contact release to a corona discharge machine or middle imprint belt 14a other than a serrate electrode are possible, a paper electrification roller, etc. as a paper electrification machine 150.

[0023] 14h of paper separation AC electric discharge machines which are an imprint material separation means is preferably constituted by the corona discharge machine. Counter drive roller 14d grounded by the fixing equipment 17 side-edge section of middle imprint belt 14a on both sides of middle imprint belt 14a if needed, and it is prepared. The alternating voltage which superimposed the direct current voltage of a toner, like-pole nature, or reversed polarity if needed is impressed, the recording paper P conveyed by middle imprint belt 14a is discharged, and it dissociates from middle imprint belt 14a.

[0024] The conveyance section 160 has the spur 162 which is an imprint material guidance means, and is prepared between the curvature section KT of the edge by the side of the fixing equipment 17 of middle imprint belt 14a, and fixing equipment 17. The conveyance section 160 prevents that, and become or a toner fixes on middle imprint belt 14a with the heat from fixing equipment 17 that the toner image supported by middle imprint belt 14a becomes with some weld, and it is hard to imprint. [that middle imprint belt 14a deforms]

[0025] The spur 162 which is an imprint material guidance means has two or more height 162a in a peripheral surface, and is prepared free [rotation] centering on the rotation support shaft 165. A spur 162 guides the rear-face side of the recording paper P, conveys the recording paper P, fixing the penetration direction to the fixing equipment 17 of the recording paper P, is stabilized and conveys the recording paper P to fixing equipment 17 while it prevents disorder of the rear-face toner image of the recording paper P which has a toner image to both sides.

[0026] The fixing equipment 17 which is a fixing means is established in the toner image on the recording paper P which has the nip section T conveyed by consisting of fixing members of the two shape of a roller of fixing roller 17a and sticking-by-pressure roller 17b which have a heater inside, carrying out pinching conveyance of the recording paper P in the nip section T between fixing roller 17a and sticking-by-pressure roller 17b, and adding heat and a pressure.

[0027] Next, an image formation process is explained.

[0028] By starting of the photo conductor drive motor which is not illustrated by the start of image recording, the photo conductor drum 10 of the image formation unit 100 of the black (K) arranged in the hand-of-cut best style position of middle imprint belt 14a rotates to the clockwise rotation shown by the arrow of drawing 1 , and grant of potential is simultaneously started by the photo conductor drum 10 of K by electrification operation of the scorotron electrification machine 11 of K.

[0029] After potential is given to the photo conductor drum 10 of K, the picture writing by the 1st chrominance signal, i.e., the electrical signal corresponding to the image data of K, is started by the exposure optical system 12 of K, and it has an electrostatic latent image corresponding to the picture of K of a manuscript picture formed in the front face of the photo conductor drum 10 of K.

[0030] Reversal development of the aforementioned latent image is carried out in the non-contact state by the development counter 13 of K, and a black (K) toner image is formed according to rotation of the photo conductor drum 10 of K.

[0031] The toner image of K used as the rear-face picture formed of the above-mentioned image formation process on the photo conductor drum 10 of K which is an image support is imprinted by imprint machine 14c of K which is an imprint means in imprint region 14b of K on middle imprint belt 14a which is a middle imprint object. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of K is discharged with 14vessels of electric discharge machines of K.

[0032] Subsequently, the toner image of K and a synchronization are taken and, as for middle imprint belt 14a, potential is given by the image formation unit 100 of yellow (Y) by the electrization of the scorotron electrification machine 11 of Y. The picture writing by the 2nd chrominance signal, i.e., the electrical signal corresponding to the image data of Y, is performed by the exposure optical system 12 of Y. Of imprint machine 14c of Y whose toner image of Y used as the rear-face picture formed on the photo conductor drum 10 of Y of the non-contact reversal development by the development counter 13 of Y is an imprint means in imprint region 14b of Y, the toner image of the upper shell Y of the toner image of the aforementioned K piles up, and is formed. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of Y is discharged with 14vessels of electric discharge machines of Y.

[0033] According to the same process, the superposition toner image of K and Y and a synchronization are taken. The toner image of M used as the rear-face picture corresponding to the image data of M by the 3rd chrominance signal formed on the photo conductor drum 10 of M of the image formation unit 100 of a Magenta (M) sets to imprint region 14b of M. Of imprint machine 14c of M which is an imprint means, the toner image of the upper shell M of the aforementioned K and the toner image of Y piles up, and is formed. Furthermore the superposition toner image of K, Y, and M and the synchronization were taken, and were formed on the photo conductor drum 10 of C of the image formation unit 100 of cyanogen (C). The toner image of C used as the rear-face picture used as the rear-face picture corresponding to the image data of C by the 4th chrominance signal sets to imprint region 14b of C. Of imprint machine 14c of C which is an imprint means, the toner image of the upper shell C of the aforementioned toner image of K, Y, and M piles up, and is formed, and the superposition color toner image of K, Y, M, and C of a rear-face picture is formed on middle imprint belt 14a. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by

imprint machine 14c of M and C is discharged with 14vessels of electric discharge machines of M and C. (Drawing 2 (A)) .

[0034] Although the toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint is cleaned by cleaning-blade 19a which consists of the rubber material which resulted in the cleaning equipment 19 as a photo conductor drum cleaning means, and contacted the photo conductor drum 10 The toner which collected in the cleaning equipment 19 of the image formation unit 100 of the black (K) arranged in the hand-of-cut best style position of middle imprint belt 14a is discharged by screw 19c from cleaning equipment 19. For example, through conveyance pipe 19d which connotes the rotating spiral spring and conveys a toner, it is conveyed again to the development counter 13 of K, and is recycled (reuse). It is arranged at the downstream of the black (K) image formation unit 100, the toner image supported on middle imprint belt 14a may carry out a re-imprint (adhesion) to the photo conductor drum 10 at the following image formation process, and reuse can be impossible easily. The toner in the cleaning equipment 19 formed in yellow (Y), a Magenta (M), and each image formation unit 100 of cyanogen (C) is discharged by screw 19c from cleaning equipment 19. For example, it is conveyed to the container 190 for toner recycling through conveyance pipe 19d which connotes the rotating spiral spring and conveys a toner, and is collected in the container 190 for toner recycling. It becomes recyclable [a black toner], without the toner of other colors carrying out color mixture to the black toner which operating frequency tends to recycle highly by this.

[0035] After the superposition color toner image which turns into a rear-face picture on middle imprint belt 14a as mentioned above is formed, the synchronization with the color toner image of the rear-face picture currently succeedingly supported by middle imprint belt 14a is taken, and the toner image of K which turns into a surface picture of K by the image formation unit 100 of K is formed on the photo conductor drum 10 of K like the above-mentioned color picture formation process. Under the present circumstances, image data is changed so that the surface picture of K formed on the photo conductor drum 10 of K may turn into a mirror image to the rear-face picture formed on the photo conductor drum 10 of Above K.

[0036] In connection with the surface image formation of K to the photo conductor drum 10 top of K, from the feed cassette 15 whose recording paper P which is imprint material is an imprint material receipt means It is sent out by send roller 15a and conveyed to timing roller 15b as an imprint material feed means. by the drive of timing roller 15b The synchronization with the toner image of the surface picture of K supported on the photo conductor drum 10 of K and the color toner image of the rear-face picture currently supported by middle imprint belt 14a is taken, and imprint region 14b of K is fed. Under the present circumstances, paper electrification is carried out at a toner and like-pole nature, middle imprint belt 14a is adsorbed by the paper electrification machine 150 serrate in the nose of cam where it considered as the contact state and the direct current voltage of a toner and like-pole nature (it sets in this operation gestalt and is minus polarity) was impressed to the recording paper P, and imprint region 14b of K is fed with the recording paper P with it (drawing 2 (B)). By performing paper electrification to a toner and like-pole nature, it prevented paying well with the toner image on middle imprint belt 14a, or the toner image on the photo conductor drum 10 of K, and disorder of a toner image is prevented.

[0037] In imprint region 14b of K, the surface picture on the photo conductor drum 10 of K is imprinted by imprint machine 14c of K as an imprint means by which polar (it sets in this operation gestalt and is plus polarity) voltage opposite to a toner was impressed, on the front face of the recording paper P. At this time, the rear-face picture on middle imprint belt 14a exists on middle imprint belt 14a without the recording paper's P imprinting. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of K is discharged with 14vessels of electric discharge machines of K.

[0038] Similarly the synchronization with the color toner image of a rear-face picture and the

toner image of the surface picture of K which are supported by middle imprint belt 14a is taken. The toner image of the surface picture of Y, M, and C is formed on the photo conductor drum 10 of the image formation unit 100 of Y, M, and C. The toner image of the surface picture of Y, M, and C by each imprint machine 14c as an imprint means by which polar (it sets in this operation gestalt and is plus polarity) voltage opposite to a toner was impressed by imprint region 14b of Y, M, and C Y on each photo conductor drum 10, The color toner image of the surface picture of M and C is imprinted one by one by the front face of the recording paper P in order of Y, M, and C. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of Y, M, and C is discharged with 14vessels of electric discharge machines of Y, M, and C. At this time, the rear-face picture on middle imprint belt 14a exists on middle imprint belt 14a without the recording paper's P imprinting. Under the present circumstances, with having mentioned above, similarly, image data is changed so that the surface picture of Y, M, and C which are formed on the photo conductor drum 10 of Y, M, and C may become with a mirror image to the rear-face picture formed on the photo conductor drum 10 of Above Y, M, and C, respectively.

[0039] The recording paper P with which the color toner image was imprinted by the front face is conveyed at 14g of rear-face imprint machines as a rear-face picture imprint means by which polar (it sets in this operation gestalt and is plus polarity) voltage opposite to a toner was impressed, and the color toner image of the rear-face picture on the peripheral surface of middle imprint belt 14a bundles it up with 14vessels of rear-face imprint machines, and it is imprinted by the rear face of the recording paper P (drawing 2 (C)).

[0040] The recording paper P with which the color toner image was formed in both sides By the curvature of the curvature section KT of middle imprint belt 14a, and the electric discharge operation with 14h of paper separation AC electric discharge machines as an imprint material separation means prepared in the edge of middle imprint belt 14a if needed Dissociate from middle imprint belt 14a, and it is conveyed through the spur 162 prepared in the conveyance section 160 to the fixing equipment 17 as a fixing means. It is fixed to the toner image on the recording paper P by conveying between the nip sections T between fixing roller 17a and sticking-by-pressure roller 17b, and being able to add heat and a pressure in the nip section T. The recording paper P with which double-sided image recording was made has the front reverse side reversed, is sent, and is discharged with the delivery roller 18 to the tray of the equipment exterior.

[0041] The toner which remained on the peripheral surface of middle imprint belt 14a after an imprint is countered and formed in follower roller 14e on both sides of middle imprint belt 14a, and is cleaned by the middle imprint object cleaning equipment 140 which is a middle imprint object cleaning means have the middle imprint object cleaning blade 141 in which contact and contact release are possible in middle imprint belt 14a by using a pivot 142 as the rotation supporting point.

[0042] Moreover, cleaning equipment 19 removes a remains toner, the history of the photo conductor drum 10 in previous image formation is canceled by the uniform photographic filter before non-illustrated electrification, and the toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint is in the following image formation cycle. As mentioned above, the toner which collected in the cleaning equipment 19 of the image formation unit 100 of the black (K) arranged in the hand-of-cut best style position of middle imprint belt 14a is conveyed again to the development counter 13 of K, and is recycled (reuse). It is arranged at the downstream of the black (K) image formation unit 100, the toner image supported on middle imprint belt 14a may carry out a re-imprint (adhesion) to the photo conductor drum 10 at the following image formation process, and reuse can be impossible easily. The toner in the cleaning equipment 19 formed in yellow (Y), a Magenta (M), and each image formation unit 100 of cyanogen (C) is conveyed to the container 190 for toner recycling, and are collected in the container 190 for toner recycling.

[0043] It becomes recyclable [the black toner which is not conspicuous even if it is prevented by the above that the black toner on a middle imprint object adheres to the image support of other colors, operating frequency is high and it carries out color mixture most by it]. It becomes recyclable [the black toner which is not conspicuous even if it is prevented that the black toner on a middle imprint object adheres to the image support of other colors especially at the time of a jam, operating frequency is high and it carries out color mixture most].

[0044] Of course, also do single-sided image formation which forms a picture at one side of only the front face of imprint material, or a rear face out of the double-sided image formation which forms a picture in both sides of imprint material which was explained with the above-mentioned operation form with above color picture formation equipment.

[0045] It can rotate focusing on the medial axis J1 of axis-of-rotation roller 14k. moreover, the belt with which middle imprint belt 14a is inscribed in the support plate 301 of both sides according to drawing 3 -- alienation -- It is arranged in the hand-of-cut best style position of middle imprint belt 14a. The downstream of the black (K) image formation unit 100 in which toner recycling is possible, The photo conductor drum 10 of the image formation unit 100 of Y, M, and C, and Y which counters, Drive roller 14d which lays 14m of electric discharge machines and 14g of rear-face imprint machines of imprint machine 14c of M and C, and Y, M and C, 14h of paper separation AC electric discharge machines, and middle imprint belt 14a, the belt of ground roller 14j, tension roller 14i, and the support-plate 301 center of rotation -- alienation -- axis-of-rotation roller 14k etc. is attached in a support plate 301 Moreover, the support plate 302 of both sides can be rotated focusing on the drive roller 14d medial axis J2, and the spur 162 and the fixing equipment 17 which are an imprint material guidance means are attached in a support plate 302.

[0046] the time of the monochrome image formation by the black (K) toner -- a belt -- alienation -- a support plate 301 is rotated focusing on the medial axis J1 of axis-of-rotation roller 14k, the support plate 301 which has middle imprint belt 14a is moved, and middle imprint belt 14a is made to estrange from yellow (Y), a Magenta (M), and the image formation unit 100 of cyanogen (C)

[0047] The rack LK in which the lever 310 which holds a support plate 301 in the state where it was dashed against stopper 302a which engaged with the bottom edge of a support plate 301 in the end, and was prepared in it at the support plate 301 was formed by the other end By rotation of Pinion PN which connects on this rack LK, for example, rotates through non-illustrated a control section and a drive motor at the time of selection of monochrome image formation from a non-illustrated control unit A lever 310 rotates centering on the fixed shaft 311 in an alternate long and short dash line **** position from the position shown in drawing 3 as a solid line. It rotates. the alternate long and short dash line **** position from a position which a support plate 301 shows to drawing 3 as a solid line in connection with this -- a belt -- alienation -- until it contacts stopper 310a by using the medial axis J1 of axis-of-rotation roller 14k as the supporting point In the state [that middle imprint belt 14a is in contact with the image formation unit 100 of K], it is estranged from the image formation unit 100 of Y, M, and C. Under the present circumstances, in order to guarantee penetration of the recording paper P to fixing equipment 17, while the support plate 302 currently stopped and held by stopper 301a prepared in the support plate 301 rotates the drive roller 14d medial axis J2 as a center with movement which is drive roller 14d, it is moved below to the position stopped in stopper 302a. A spur 162 and fixing equipment 17 are moved below with movement of a support plate 302 (repositioning). The recording paper P is guided by the spur 162 moved below as a dotted line showed to drawing 3 , and it is fixed to the toner image on the recording paper P by being conveyed to the fixing equipment 17 moved below, conveying between the nip sections T between fixing roller 17a and sticking-by-pressure roller 17b, and being able to add heat and a pressure in the nip section T.

[0048] Moreover, as shown in drawing 4 , the spur 162 which is an imprint material guidance

means is attached. The support plate 303 which can rotate is formed focusing on the drive roller 14d medial axis J2. In order to guarantee penetration of the recording paper P to fixing equipment 17 with movement (movement in the alternate long and short dash line **** position shown in drawing 4 as a solid line from a position) in the lower part of the support plate 301 which has middle imprint belt 14a, The support plate 303 of the both sides currently stopped and held by stopper 301a prepared in the support plate 301 with movement of drive roller 14d It is possible to also make it incline and move to the position stopped in stopper 303a, making an alternate long and short dash line **** position rotate the drive roller 14d medial axis J2 as a center from the position shown in drawing 4 as a solid line. With movement of a support plate 303, a spur 162 inclines and it is moved caudad (repositioning). It is fixed to the toner image on the recording paper P by the recording paper's P being guided by the spur 162 arranged by inclining as a dotted line shows to drawing 4 , conveying it to fixing equipment 17, conveying between the nip sections T between fixing roller 17a and sticking-by-pressure roller 17b, and being able to add heat and a pressure in the nip section T.

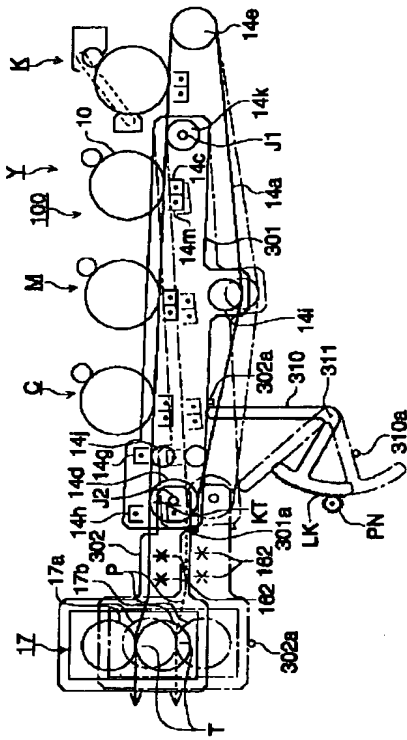
[0049] It becomes recyclable [the black toner which is not conspicuous even if it is prevented by the above that the black toner on a middle imprint object adheres to the image support of other colors, operating frequency is high and it carries out color mixture most by it]. It

becomes recyclable [the black toner which is not conspicuous even if it is prevented that the black toner on a middle imprint object adheres to the image support of other colors especially at the time of a jam, operating frequency is high and it carries out color mixture most].

[0050] The composition explained by above-mentioned drawing 2 or drawing 4 Yellow (Y), a Magenta (M), An image formation means is arranged in parallel on two or more set middle imprint object in order of cyanogen (C) and black (K). Color picture formation equipment and yellow (Y) which convey imprint material on a middle imprint object, pile up a toner image one by one and form a color toner image on imprint material, An image formation means is arranged in parallel on two or more set middle imprint object in order of a Magenta (M), cyanogen (C), and black (K). It is possible to suppose that it is the same also about the color picture formation equipment which imprints on imprint material collectively and forms a color toner image, after piling up a toner image one by one on a middle imprint object. it becomes recyclable [the black toner which is not conspicuous even if it is prevented that the black toner on the same effect, i.e., the Nakama imprint object, adheres to the image support of other colors, operating frequency is high and it carries out color mixture to this having mentioned above most] It becomes recyclable [the black toner which is not conspicuous even if it is prevented that the black toner on a middle imprint object adheres to the image support of other colors especially at the time of a jam, operating frequency is high and it carries out color mixture most].

[Translation done.]

Drawing selection [Representative drawing] 



[Translation done.]

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JAPANESE

[JP,2000-206755,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the cross-section block diagram showing 1 operation gestalt of the color picture formation equipment in connection with this invention.

[Drawing 2] It is drawing showing the toner image formation state in the color picture formation equipment in connection with this invention.

[Drawing 3] It is drawing showing movement of alienation and the fixing means of a middle imprint object, and an imprint material guidance means.

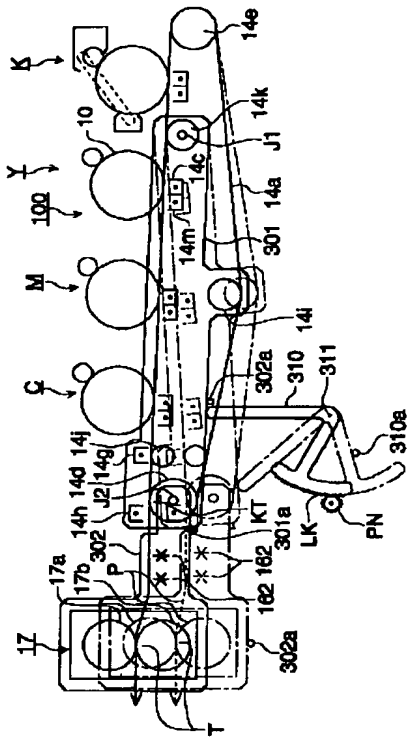
[Drawing 4] It is drawing showing other examples of movement of an imprint material guidance means.

[Description of Notations]

- 10 Photo Conductor Drum
- 11 Scorotron Electrification Machine
- 12 Exposure Optical System
- 13 Development Counter
- 14a Middle imprint belt
- 14c Imprint machine
- 14d Drive roller
- 14g Rear-face imprint machine
- 14h Paper separation AC electric discharge machine
- 14k a belt -- alienation -- an axis-of-rotation roller
- 17 Fixing Equipment
- 19 Cleaning Equipment
- 100 Image Formation Unit
- 162 Spur
- 190 Container for Toner Recycling
- 301,302,303 Support plate
- P Recording paper

[Translation done.]

Drawing selection [Representativ drawing] 



[Translation done.]

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JAPANESE

[JP,2000-206755,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
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[Translation done.]

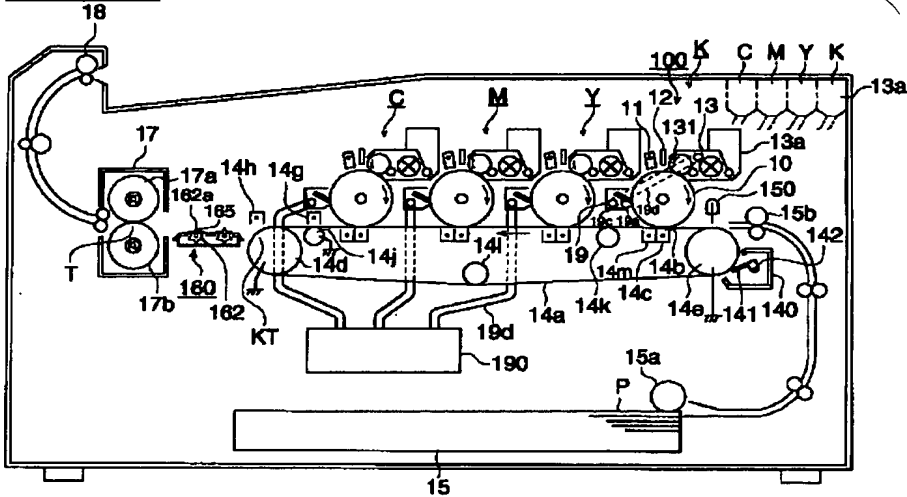
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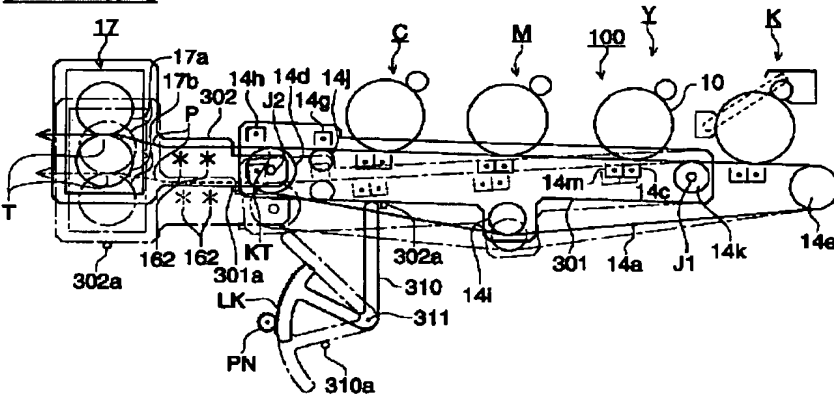
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DRAWINGS

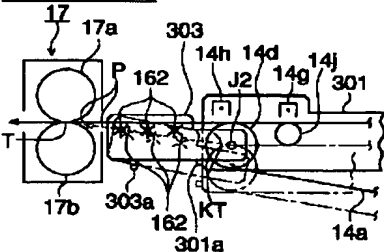
[Drawing 1]



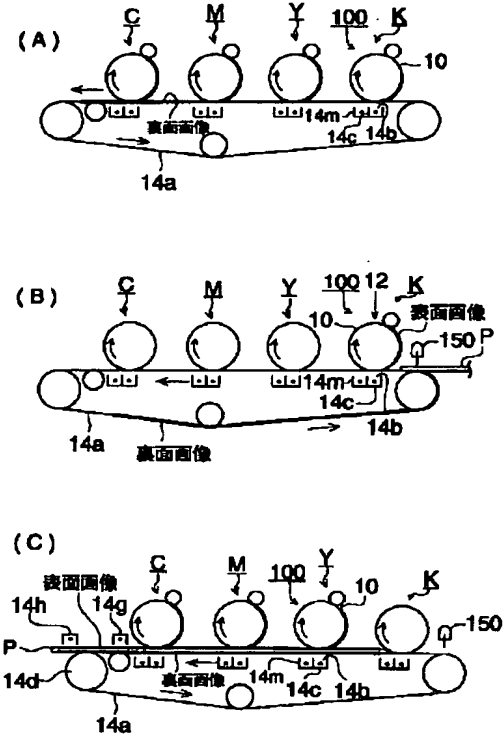
[Drawing 3]



[Drawing 4]

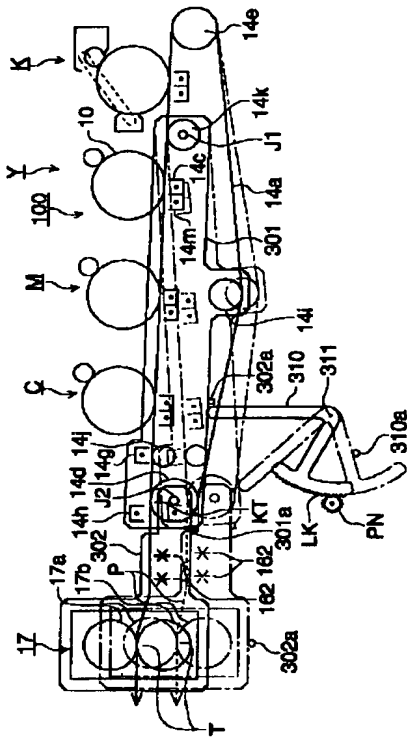


[Drawing 2]



[Translation done.]

Drawing selection [Representative drawing] 



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たりすることを防止する。

【0025】転写手段である撮車162は、周囲に複数の突起部162aを有し、回転支持軸165を中心として回転自在に設けられる。撮車162は、記録紙Pの裏面側をガイドして記録紙Pを搬送し、両面にトナー像を有する記録紙Pの裏面トナー像の乱れを防止するとともに、記録紙Pの定着装置17への進入方向を一定にしながら記録紙Pを安定して定着装置17へと搬送する。

【0026】定着手段である定着装置17は、内部にトナー像を有する定着ローラ17aと圧着ローラ17bとの2本のローラ状の定着部材で構成され、定着ローラ17aと圧着ローラ17bとの間のニップ部Tで記録紙Pを挟持搬送し、熱と圧力とをくわえることにより、ニップ部Tを搬送される記録紙P上のトナー像を定着する。

【0027】次に画像形成プロセスを説明する。

【0028】画像記録のスタートにより不図示の感光体駆動モータの始動により、中間転写ベルト14aの回転方向最上流位置に配置される黒色(K)の画像形成ユニット100の感光体ドラム10が図1の矢印で示す時計方向へ回転され、同時にKの感光体ドラム10に電位の付与が開始される。

【0029】Kの感光体ドラム10は電位を付与されたあと、Kの露光光学系12によって第1の色信号すなわちKの画像データに対応する電気信号による露光露光が開始され、Kの感光体ドラム10の表面に原画像のKの画像に対応する露光画像を形成される。

【0030】前記の露光はKの現像器13により非接触状態で反転露光され、Kの感光体ドラム10の回転に比して黒色(K)のトナー像が形成される。

【0031】上記の画像形成プロセスによって像担持体であるKの感光体ドラム10上に形成された裏面画像と、中間転写ベルト14a上に転写されたトナー像が、Kの感光体ドラム10の回転によって、中間転写手段であるKの転写器14cによって、中間転写手段である中間転写ベルト14a上に転写される。また、Kの転写器14cにより荷電された中間転写ベルト14aの電荷はKの除電器14mにより除電される。

【0032】次いで中間転写ベルト14aは、Kのトナー像と同様に取られ、イエロー(Y)の画像形成ユニット100によりYのスコトロフ帯電装置110の帯電作用により電位が付与され、Yの露光光学系12によって第2の色信号すなわちYの画像データに対応する電気信号による露光露光が行われ、Yの現像器13による非接触状態で反転露光によってYの感光体ドラム10上に形成された裏面画像となるYのトナー像が、Yの転写器14bにおいて、転写手段であるYの転写器14cによって、前記のKのトナー像の上からYのトナー像を重ね合わせ形成される。またYの転写器14cにより荷電された中間転写ベルト14aの電荷はYの除電器14mにより除

感光体ドラム10上に形成される。この際、Kの感光体ドラム10上に形成されるKの表面画像は、前記Kの感光体ドラム10上に形成した裏面画像に対して鏡像となるように画像データが変更される。

【0033】Kの感光体ドラム10上へのKの表面画像形成にともなう転写手段である記録紙Pが転写手段である記録紙Pにセット15より送り出しローラ15aにより送り出され、転写手段であるタイミンギングローラ15bへ搬送され、タイミンギングローラ15bの駆動によって、Kの感光体ドラム10上に担持されたKの表面画像のトナー像と、中間転写ベルト14aに担持されている裏面画像のカラートナー像との同期がとられて、Kの転写器14bへ給送される。この際、記録紙Pに当接状態とされトナー像と同様に、本実施形態においては、イナズナ電圧の直流電圧が印加された先端が螺旋状の紙帯電器150により、記録紙Pがトナー像と同様に紙帯電され、中間転写ベルト14aに吸着されてKの転写器14bへ給送される(図2(B))。トナーと同様に紙帯電を行うことにより、中間転写ベルト14a上のトナー像とKの感光体ドラム10上のトナー像と引き合うことを防止し、トナー像の乱れを防止している。

【0037】Kの転写器14bではトナーと反対極性(本実施形態においてはプラス極性)の電圧が印加され、感光体ドラム10上の表面画像が記録紙Pの表面に転写される。このとき、中間転写ベルト14a上の表面画像は、記録紙Pに転写されないで中間転写ベルト14a上に存在する。またKの転写器14cにより荷電された中間転写ベルト14aの電荷はKの除電器14mにより除電される。

【0038】同様にして、中間転写ベルト14aに担持されている裏面画像のカラートナー像とKの表面画像のトナー像との同期がとられて、Y、M、Cの画像形成ユニット100によりY、M、Cの表面画像のトナー像が、Y、M、Cの転写器14dでトナーと反対極性(本実施形態においてはプラス極性)の電圧が印加された転写手段としての各転写器14cによって各感光体ドラム10上のY、M、Cの表面画像のカラートナー像が、Y、M、Cの順に記録紙Pの表面に順次転写される。またY、M、Cの転写器14cにより荷電された中間転写ベルト14aの電荷はY、M、Cの除電器14mにより除電される。このとき、中間転写ベルト14a上の表面画像は、記録紙Pに転写されないで中間転写ベルト14a上に存在する。この際前述したと同様に、Y、M、Cの感光体ドラム10上に形成されるY、M、Cの表面画像は、前記Y、M、Cの感光体ドラム10上に形成した裏面画像に対してそれぞれ鏡像となるように画像データが変更される。

【0039】表面にカラートナー像が転写された記録紙

Pは、トナーと反対極性(本実施形態においてはプラス極性)の電圧を印加した裏面画像転写手段としての裏面転写器14gへと搬送され、裏面転写器14gにより中間転写ベルト14aの周面上の裏面画像のカラートナー像が一括して記録紙Pの表面に転写される(図2(C))。

【0040】両面にカラートナー像が形成された記録紙Pは、中間転写ベルト14aの曲率部KTの曲率と、中間転写ベルト14aの端部に必要に応じて設けられる転写部Tで熱と圧力とをくわえられることにより、記録紙P上のトナー像が定着される。両面画像記録がなされた記録紙Pは裏裏を反転されて送られ、排紙ローラ18により裏面外部のトレイへ排出される。

【0041】転写後の中間転写ベルト14aの周面上に残ったトナーは、中間転写ベルト14aを挟んで後述ローラ14eに対向して設けられ、支持ローラ142を回転点として中間転写ベルト14aに当接及び当接後除去可能な中間転写器クリーニング装置141を有する中間転写器クリーニング手段である中間転写器クリーニング装置140によりクリーニングされる。

【0042】また、転写後の各色毎の感光体ドラム10の周面上に残ったトナーは、クリーニング装置19により残留トナーを除去され不図示の帯電電極の露光露光により先の画像形成における感光体ドラム100の電位が解消され、次の画像形成サイクルにはいる。前述したように、中間転写ベルト14aの回転方向最上流位置に配置される黒色(K)の画像形成ユニット100のクリーニング装置19内に溜まったトナーは再度Kの現像器13へと搬送されてリサイクル(再利用)され、黒色(K)の画像形成ユニット100の下流側に配置され、中間転写ベルト14a上に担持されるトナー像が次の画像形成工程で感光体ドラム10に再転写(付着)する可能性があり再利用ができにくい、イエロー(Y)、マゼンタ(M)及びシアン(C)の各画像形成ユニット100に設けられるクリーニング装置19内のトナーはトナー回収器190へと搬送され、トナー回収器190内に回収される。

【0043】上記により、中間転写手段上の黒色トナーが他の色の像担持体に付着することが防止され、最も使用頻度が高く、色別でも目立たない黒色トナーのリサイクルが可能となる。特にジャム時においても、中間転写手段上の黒色トナーが他の色の像担持体に付着することが防止され、最も使用頻度が高く、色別でも目立たない黒色トナーのリサイクルが可能となる。

【0044】上記のカラー画像形成装置では、上述の真

